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The Papers read were—

1. *On the Trigonometrical Survey and Physical Configuration of the Valley of Kashmir.* By WILLIAM H. PURDON, Esq., F.R.G.S., Executive Engineer, Punjab.

Communicated by SIR CHARLES WOOD, Bart., M.P., F.R.G.S., India Office.

THE valley of Kashmir is somewhat of an oval form, 89 miles long, from 10 to 35 in width, and upwards of 5000 feet above the sea. It is surrounded by a magnificent cordillera of mountains, snow clad during eight months of the year, whose highest ridge is usually from 10 to 20 miles from their bases. The monarch of all of them is the bare mass of the Diarmal; no snow can cling to it on account of the steepness of its sides; it rises to 26,629 feet above the sea, and forms the culminating point of a vast mountain mass which exceeds 20,000 feet in height in a radius of 15 miles around it. It is 900 miles distant from the great Mount Everest, and lies on the range of the true Himalaya, that, even in this latitude, asserts its great superiority over all other mountain ranges in the world.

The defile by which the river, that drains the valley of Kashmir, finds its exit, is also on the grandest scale. The chain of the Himalaya is there cleft by a great chasm, whose almost perpendicular sides are 7000 feet in depth. The bottom of the chasm is wholly occupied by the river; its entire volume being constricted to a width of only 70 feet in one place, and its waters gliding for 10 miles, with astonishing velocity, in an unbroken stream. After this point the river becomes a succession of rapids and a sheet of foam, forming a fine contrast to the dark forests of oaks, planes, and cedars, which here clothe its banks to the very edge of the waters. It is probable that these cedar forests furnished the fleet of Nearchus upwards of twenty centuries ago; and it is from them that the Punjab still obtains its chief supply of this almost imperishable timber.

Mr. Purdon describes at considerable length the history and the geological features of the valley of Kashmir, and he dwells upon the difficulties, the importance, and the magnitude of the operations of the Great Trigonometrical Survey of India.

The CHAIRMAN said that, in the paper, a portion of which had been read, the writer had embraced many things which went far beyond the mere description of the very beautiful map suspended upon the wall, and made special and most useful reference to the geology of the region he was describing. The map which represented the physical features of the country was worthy of very special attention. It had been constructed under the direction of Colonel Waugh by Captain Montgomerie, and one of the most active persons in its compilation, besides Mr. Purdon, was his young friend Captain Godwin Austen.

The last-named gentleman has just handed in a paper, additional to the one, a part of which the meeting had listened to, relating to the more mountainous part of Kashmir, which time would not allow of being read, but which would be shortly printed in the Journal of the Society: though perhaps Captain Godwin Austen would like to address the meeting. He was happy to state that Colonel Everest, so distinguished as the former director of the Great Trigonometrical Survey of India, was present, and also Mr. Vigne, who had published the best map of the country that had been hitherto prepared.

COLONEL GEORGE EVEREST, V.P.R.G.S., felt exceedingly indebted to Sir Roderick Murchison for the handsome way in which he had spoken of him. For twenty-five years of his life he had been connected with the trigonometrical survey of India, and took great interest in his old department. For the first five years he was associated with Colonel Lambton, whom he succeeded, and two years afterwards was obliged to come to England on account of his health. While in this country he obtained some most perfect instruments, and returned to India. But, at the commencement of 1830, he had nobody there that could use them, and had to train all his assistants. It was the most fortunate event of his life that he met with gentlemen like Colonel Waugh and Major Renny Tailyour, each of whom possessed great ability and extreme willingness to learn; and, on retiring from the survey, he was satisfied that he left the work in the most efficient hands. The department, whether personal or material, was in the highest order; it was a fine establishment, and possessed of some of the best instruments in the whole world. The beautiful map behind the chair, which could not be characterised in terms that were too high, was a good proof of the knowledge and skill employed in the survey. By reference to the triangulation they would better understand the degree of excellence which had been attained. The great object of a trigonometrical survey was to prevent the accumulation of error. If a number of trigonometrical points, determined with sufficient accuracy, were placed in different localities, there could be no error beyond those points. All the principal triangles, moreover, were arranged into polygonal forms, so as, by mutual compensation, to eliminate each other's errors, whether personal or instrumental, from which no observations can pretend to be entirely free. An error of fifty feet in the position of an internal point might be made; and in fact, in latitudes and longitudes limited to the nearest second, such errors are inevitable, seeing that one second of latitude is equivalent to about 102 feet, but it can go no further, for the linear dimensions of the principal triangles are retained, and are not subject to this objection, so that errors cannot accumulate.

CAPTAIN H. GODWIN AUSTEN, F.R.G.S., declined to speak, but presented his paper on the same subject, expressing his hope that it might prove acceptable to the Society.

MR. G. T. VIGNE, F.R.G.S., also expressed his grateful thanks for the flattering notice of his map, and the results of his travels in Kashmir, &c., and added, that he considered the completion of the G. T. S. Map (which seemed to him as beautiful as it was accurate) was no ordinary subject for congratulation. He was not without hopes that the public might now be induced to view the acquisition of Kashmir (by fair means) in the same light as he had always done. It was actually part of the Punjab, and he had always considered it as a place of great importance to the security of our north-western frontier in India. Possessed of a European climate, it was at once a fortress, a depôt, and a sanatarium. It would be a miniature England in the heart of Asia, and there would there be English racing, English farming, English mining, English fox-hunting, and English cricket; and, with a good road through the Baramula Pass, a British force in the highest state of health and appointment could, in a very few days, be marched thence to deploy along the banks of the Indus, or meet any invader in the passes of Affghanistan.

MR. J. GERSTENBERG, F.R.G.S., said that it was of the greatest interest to the Society to find that important geographical researches are undertaken, not exclusively for the purpose of ascertaining the configuration of the earth, but also with a view to the practical application of the knowledge acquired for accelerating intercommunication, for the extension of commerce, and for the general benefit of mankind. It is, therefore, most gratifying to us to have just heard, that during the trigonometrical survey of India, over the stupendous extent of upwards of one million of square miles, not only the relative altitudes were fixed, but also the most favourable localities were ascertained for the introduction of railways and canals. The surveyors should also carefully examine the climatic condition of the various localities for the purpose of transplanting such products as might be successfully cultivated there, and for the supply of which we are now chiefly dependent upon foreign countries. This has been satisfactorily accomplished with respect to tea, by its introduction into Assam, and with regard to cotton by transplanting various species into several districts of India. But there is another article, yet more necessary than food and clothing, for it constitutes the sole remedy against the deadly attacks of fever in tropical countries, to which enemy so many of our valiant soldiers succumb—I mean quinine. The British Government pay for this medicament about 60,000*l.* annually, and we are entirely dependent for its supply upon South America, in which country alone it is at present produced. He was most happy to state, that the Indian Government, urged by a British commercial corporation, of which he had the honour to be a member, have at last consented to carry out the important project of transplanting the quinine yielding cinchona tree to suitable localities of the Indian empire, and that Mr. Markham, a Fellow of this Society, was one of the gentlemen to whom the execution of this interesting enterprise has been intrusted.

The second Paper read was—

2. *British Columbia. Journeys in the Districts bordering on the Fraser, Thompson, and Harrison Rivers.* By Lieuts. MAYNE, R.N., and PALMER, R.E., and Chief-Justice M. BEGBIE.

Communicated by the DUKE of NEWCASTLE, Colonial Office.

THE above communications are written at considerable length, and are so largely occupied with the description of numerous but essential details, that it is impossible to do justice to them in so short an abstract as the following, especially without the assistance of a map.

Lieutenant Palmer was ordered by Colonel Moody to make an engineering reconnaissance of the neighbourhood of Fraser River. He reports minutely on the steps that should be taken at each point of his route in order to make a good communication for cart or boat traffic. He has fixed the geographical positions of numerous places, and he gives a detailed account of all the patches of land available for cultivation which fell under his notice. His report is accompanied by six explanatory plans and three photographic views.

Lieutenant Mayne was detached from H.M.S. *Plumper* by order of Captain Richards on a somewhat similar errand to that above